

Dry Rollover and Egress Training (DRET)



USMC Student Course

November 2010



Why DRET Training?



¹Army tactical vehicle rollovers, FY01 - 05/09

- 1219 rollovers
- 809 injuries
- 225 fatalities

²**80% reduction in Gunner fatalities if egress trained**

³**250% greater change of survival if egress trained**



Terminal Learning Objective (TLO)

Perform dry rollover and egress procedures within two minutes.



Enabling Learning Objectives (ELOs)

Classroom:

1. Recognize rollover-relevant characteristics, components, and considerations of tactical wheeled vehicles.
2. Recall the guidelines for avoiding a wheeled vehicle rollover accident.
3. Recall the emergency procedures performed to react to an imminent rollover.
4. Recall the emergency procedures performed after a dry rollover accident.
5. Recall the characteristics and prevention of motion sickness and heat exhaustion.

Training Devices:

6. Egress from dry vehicle.
7. Account for crewmembers.
8. Establish security.



Training Agenda

Lesson 1: Classroom

- L1 - Academic materials
 - Rollover-relevant characteristics
 - Avoidance
 - Emergency procedures
 - Training safety
- L1 - Written exam

Lessons 2-5: HEAT & MET Devices

- L2 - MET demonstration
- L3 - MET practical application
- L4 - HEAT demonstration
- L5 - HEAT practical application



Safety/Cease Training (CT) Brief

Cease Training (CT):

- In cases of tornado, fire, or earthquake
- Immediately if anyone is injured or device is damaged
- Power outages and other safety concerns – instructor decides

SAFETY FIRST



Rollover-Relevant Characteristics, Components, & Considerations

USMC Wheeled Vehicles:

- HMMWVs (most common in rollovers)
- MRAPs (most common in rollovers⁸)
- MTVRs
- LVSRs
- LAVs
- M-ATV



Know your vehicle's:

- Max. side slope operation (i.e., rollover angle)
- Restraint systems
- Egress points
- Egress considerations



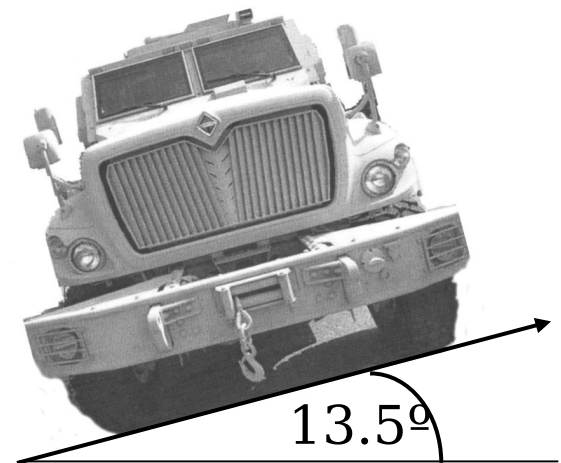
Rollover-Relevant Characteristics, Components, & Considerations

Side Slope Rollover Angles:

- Know your vehicle!
- Side slope decreases as load/CG moves up or shifts from side-to-side.
- You will learn what a 13 degrees side slope looks and feels like

Vehicle	Percent Side Slope	Degrees Side Slope
ECV HMMWV ⁹	30	13.5
MTVR ¹⁰	30/40*	13.5/18
LVSR ¹¹	30/40*	13.5/18
FPI Cat I ¹²	30	13.5
FPI Cat II ¹³	30	13.5
MATV ¹⁴	40	18

*30 percent side slope @ 15 mph and 40 percent side slope @ 5 mph @ GVWR



Rollover-Relevant Characteristics, Components, & Considerations

Restraint Systems:



¹⁵Presented with permission from DriveCam Inc.



Rollover-Relevant Characteristics, Components, & Considerations

Restraint Systems Cont.:

- Seatbelts are NOT a hazard; they will save your life!
- 440% greater chance of hospitalization when not worn¹⁶.
- 300% greater chance of fatality when not worn during tactical vehicle operations¹⁷.
- 94% greater chance of surviving a HMMWV rollover when worn¹⁸.
- Know your restraint system. Operation and quick release.
- Marines required to wear¹⁹.



Rollover-Relevant Characteristics, Components, & Considerations

Egress Points:

- Variety
- Side doors, roof hatches, Gunner's turret, window exits, rear doors
- Know your vehicle!
- Practice immediate action egress drills.

Consideration

S:

- On side
- On roof
- Egress plan
- Small exits
- Windows
- Blocked exits
- Combat locks



Questions?

Comprehension Check (click)

Review

- General characteristics
- Rollover angles
- Seatbelts
- Egress points
- Egress considerations



Rollover Avoidance

Factors:

- **Human Factors:**

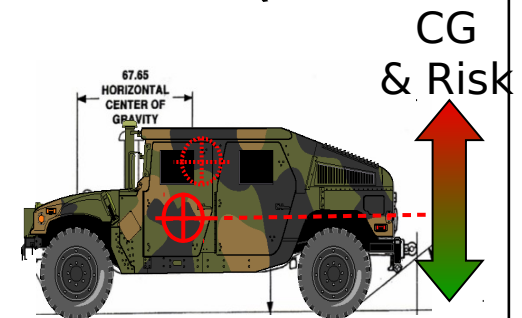
- Driving speed and maneuvering
- Driver/crew physical state, training, experience, risk management, teamwork

- **Environmental Factors:**

- Weather and visibility
- Terrain, obstacles, explosive devices, etc.
- Road, shoulder, bridge conditions

- **Vehicle Factors:**

- Vehicle condition
- Center of Gravity (CG)
- Vehicle stability characteristics



Types of Rollover:

- **Fall Initiated:**
 - Soft shoulder or ground surface gives way; unstable bridge; bridges with no side rails; etc.
- **Maneuver Initiated:**
 - Swerving to avoid an object with improper tire inflation; taking a corner too fast given weather conditions; driving on a slope that is too steep; etc.
- **Impact Initiated:**
 - Hitting a curb, pothole, or other vehicle; initiating an explosive device; etc.



Rollover Avoidance Cont.

Avoidance Guidelines:

- **Slow down.**



Rollover Avoidance Cont.

Avoidance Guidelines Cont.:

- Use caution when cresting hills/changing attitudes.



Rollover Avoidance Cont.

Avoidance Guidelines Cont.:

- **Avoid panic.**



Avoidance Guidelines Cont.:

- **Practice safe maneuvering techniques.**
 - Avoid driving on steep slopes/terrain. Plan your route.
 - Avoid sudden maneuvers and overcorrecting.
 - Maintain a "space cushion."
 - Allow greater clearance from the edge of roads, especially near drop offs and water.
 - If you drive off the edge of the road, gradually reduce speed and ease back onto roadway.
 - Do not rely on a "seat of the pants"
 - Steer into the skid.



Rollover Avoidance Cont.

Avoidance Guidelines Cont.:

- **Exercise extra caution on rural roads.**
 - Nearly 75% of rollovers occur on rural roads¹⁶.



Rollover Avoidance Cont.

Avoidance Guidelines Cont.:

- **Exercise extra caution on rural roads Cont.**



Rollover Avoidance Cont.

Avoidance Guidelines Cont.

- **Exercise extra caution around water.** (If tactical conditions permit:)
 - Reduce speed and stop vehicle.
 - Inform all that operating near water hazards.
 - Assess risk of terrain and route before proceeding.
 - Unlock combat doors.
 - Ensure all loose gear and cargo is secure.
 - Use ground guides, as needed.
- Maintain secure seating position by wearing seatbelts.



Rollover Avoidance Cont.

Avoidance Guidelines Cont.:

- Use personal protective equipment.
 - No restraint = 300% greater risk of fatality during tactical vehicle

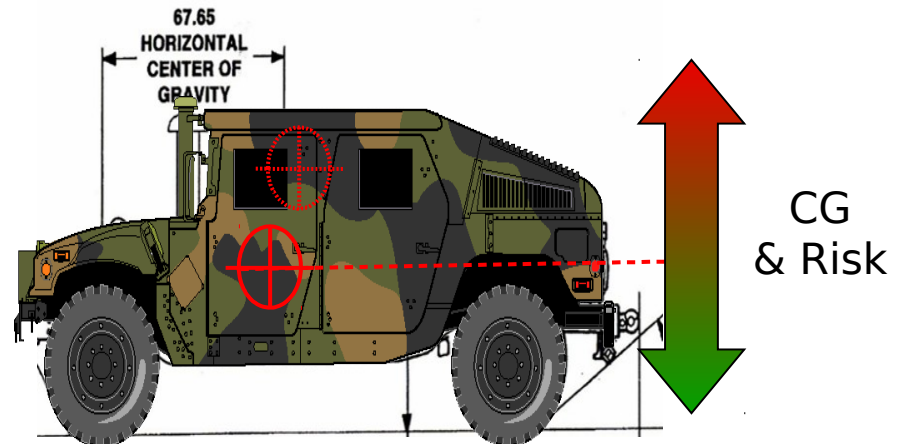
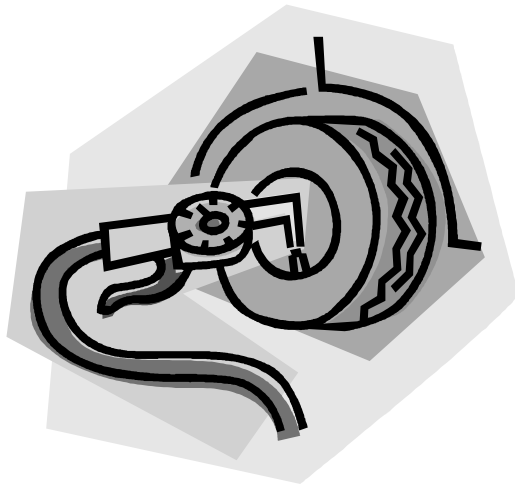


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Rollover Avoidance Cont.

Avoidance Guidelines Cont.:

- Pay attention to vehicle factors.



**The Higher the
CG,
the Higher the
Risk**



Avoidance Guidelines Cont.:

- **Manage risk.**
 - Train.
 - Retrain after vehicle modifications.
 - Pair experienced drivers with less experienced drivers.
 - Incorporate potential for rollovers in risk assessment.
 - Perform route reconnaissance.
 - Plan for adequate time. Avoid the need for speed.
 - Plan for operations without drive or blackout headlights.
 - Ensure hazards and alternate routes are briefed.
 - Assess conditions, driver experience and fatigue, etc.
 - Use personal protective equipment.



Rollover Avoidance Cont.

Avoidance Guidelines Cont.:

- **Work as a team.**
 - Maintain team member positioning within vehicle - fields of view/sectors.
 - Identify terrain or conditions for a rollover.
 - Alert driver if too close to the edge of the road, approaching a pothole/obstacle, etc.
 - Use the Gunner as the eyes and ears for the driver.
 - Use ground guides or spotters whenever driver needs additional eyes on the ground, especially near bodies of water or when cresting hills.
 - Use intercom system to pass visual information to driver, but rehearse shouted voice commands and hand signals in case of intercom failure.



Questions?

Comprehension Check (click)

Review

- Rollover factors
- Types of rollovers
- Avoidance guidelines



Vehicle Driver:

1. Upon entering the vehicle, establish an egress plan with reference points.
2. Recognize an impending rollover situation.
3. Release the accelerator.
4. Yell, "*Rollover, Rollover, Rollover!*"
5. Continue to navigate the vehicle
6. Assume brace position.



Rollover Procedures Cont.

Gunner:

1. Upon entering the vehicle, establish an egress plan with reference points.
2. Recognize an impending rollover situation.
3. Yell, "*Rollover, Rollover, Rollover!*"
4. Push/pull self down into the cab and assume brace position.



Other Crewmembers:

1. Upon entering the vehicle, establish an egress plan with reference points.
2. Recognize an impending rollover situation.
3. Yell, "*Rollover, Rollover, Rollover!*"
4. Closest occupants to the Gunner attempt to pull the Gunner into the vehicle and hold down.
5. Assume brace position.



Review

Questions?

Comprehension Check (click)

Review

- Vehicle driver weapons.
- Gunner
- Other crewmembers



Crew Dry Egress Procedures:

1. Maintain brace position until violent motion stops.
 2. Turn off engine (Driver).
 3. Disconnect headset.
 4. Get re-orient.
 5. Support yourself in the downward direction.
 6. Plan your fall.
 7. Unfasten seatbelt and immediately place hands in the
 8. ~~Direction of the fall~~ Direction of the fall re-gain orientation.
 9. Assess status of body, gear, and weapon.
 10. Assess injuries of nearby crewmembers.
- Administer buddy-aid for major injuries.



Crew Dry Egress Procedures Cont.:

12. Determine if primary or secondary egress plan is best suited for vehicle orientation.
13. Move to exit and try to unlock and open. Assist crewmembers to open exit, if needed.
14. Move to alternate egress point, if exit cannot be opened.
15. Shout "Open door (and the location)!" once available egress point is found.

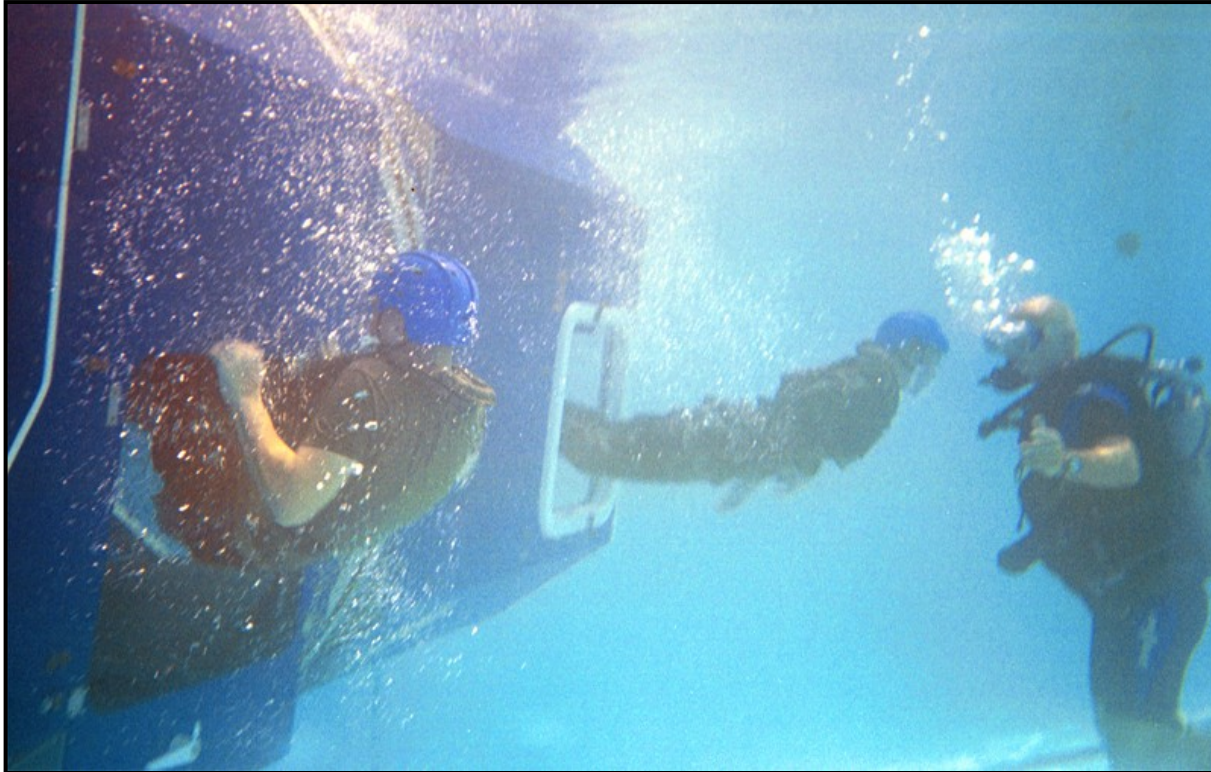


Crew Dry Egress Procedures Cont.:

16. Crack door/hatch and check for flames and/or incoming fire.
17. Activate fire extinguisher, as needed.
18. Ensure crewmembers know where the opening is and are heading for it.
19. Determine if crewmember(s) need assistance exiting the vehicle.
20. Assist moving injured crewmember(s).
21. Exit vehicle with weapon.
22. Establish security.
23. Once security is established:
 - a. Provide first aid and summon medical aid.
 - b. Inspect vehicle for fires and fire hazards.
 - c. Recover weapons, ammunition, and sensitive items.
 - d. Notify rescue personnel, remain at a safe distance, secure site.
- Assist in vehicle recovery, as required.
- i. Report mishap to higher headquarters.



Crew Wet Egress Procedure Differences:



Use reference points and get out!



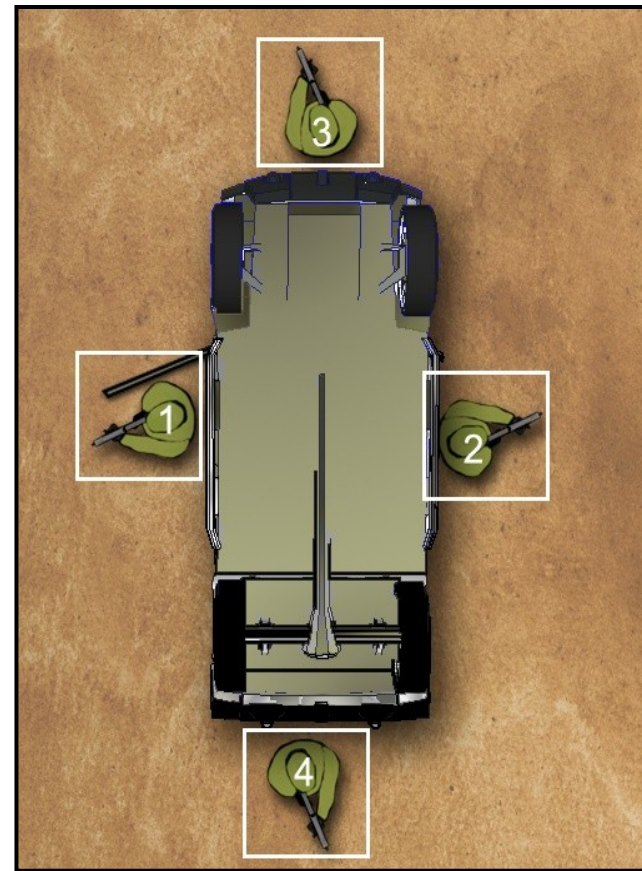
Wet Rescue Procedures:



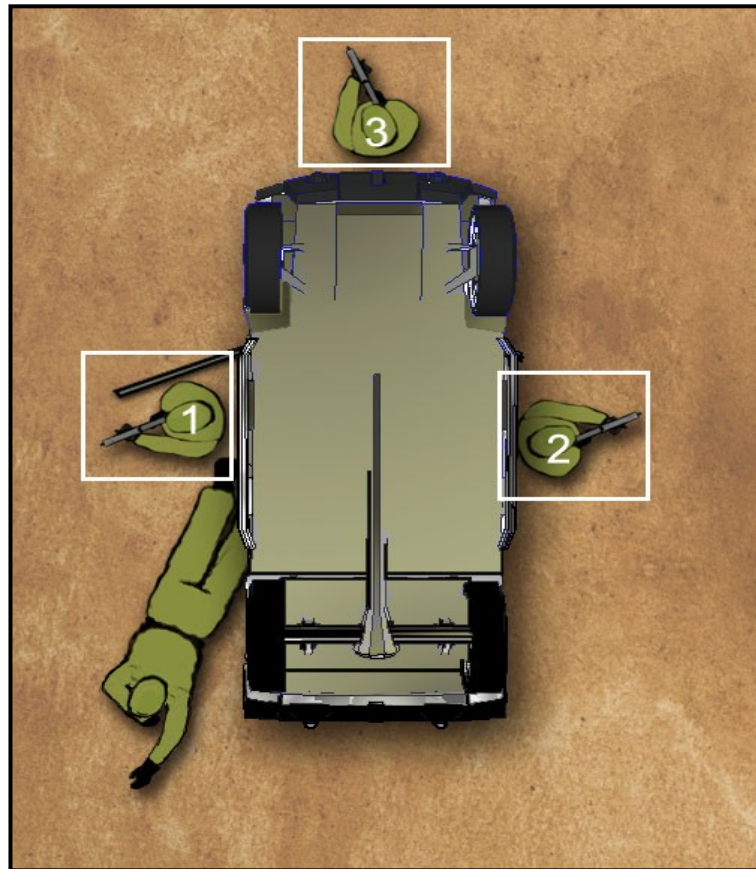
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Establishing Security After Egress: Without Injuries



Establishing Security After Egress Cont.: With Injuries



Review

Questions?

Comprehension Check (click)



Establishing security

Treating Motion Sickness and Heat Exhaustion



Review

Questions?

Comprehension Check (click)

- Review *Fast and shallow breathing*
- Motion sickness
- Heat exhaustion



Summary

The classroom instruction introduced you to:

- Rollover-relevant characteristics, components, and considerations of tactical wheeled vehicles
- Guidelines for avoiding a wheeled vehicle rollover accident
- Emergency procedures performed to react to an imminent rollover
- Emergency procedures performed after a dry rollover accident
- Characteristics and prevention of motion sickness and heat exhaustion



Next Steps

Next

Steps:

- 10 minute break
 - Written test
 - Observe MET training
 - Complete MET scenarios
 - Observe HEAT training
 - Complete HEAT scenarios

